

Groundwater arsenic occurrences in Bangladesh and mitigation options

KAZI MATIN AHMED

¹Department of Geology, Faculty of Earth & Environmental Sciences, University of Dhaka. Dhaka 1000, Bangladesh (correspondence: kmahmed@du.ac.bd)

Elevated arsenic in groundwater from natural sources has been known to occur over most of southern and parts of northern Bangladesh for more than 20 years, posing a serious health threat to the millions of the rural population that is totally dependent on groundwater for its potable needs. Arsenic mobilizes into groundwater from the reductive-dissolution of arsenic-containing amorphous iron-oxyhydroxides. The arsenic-bearing sediments were transported from the Himalayas during the last glacial maxima when the sea level was about 130 m below the present day level. The major rivers were deeply incised causing erosion of the arsenic bearing rocks. Arsenic minerals were first released into water followed by adsorption on the amorphous sediment coatings on the transported sediments. The adsorbed arsenic has been released into the groundwater when bacteria consumed the oxygen and conditions became reducing.

About 5 million of the country's more than 10 million hand-pumped wells have been tested. About 30% of the tested wells exceed the Bangladesh standard of 50 $\mu\text{g/L}$. A good number of regional to local studies have been conducted to obtain a better understanding the geochemical release mechanism and also to identify the safe aquifers. Efforts have also been made to come out with easily recognisable field criteria for targeting arsenic-safe aquifers. Despite various efforts made so far, more than 20 million people are drinking water above the allowable limit. This remains a major public health challenge for scientists and policy makers. Available scientific data will be critically reviewed in order to propose an achievable arsenic mitigation plan for Bangladesh.